DEVICE FOR FIXING IN A CONTAINER SUCH AS A METAL CAN A DEVICE AUTOMATICALLY EXTRACTING THE STRAW, AND ITS ASSOCIATED DEVICE

[0001] The present invention relates to a method of positioning in a container, such as a can, a device for automatically extracting a straw, and its associated device.

[0002] Numerous types of containers are commercially available: plastic bottles, glass bottles, metallic cans, cardboard packagings which can have various shapes allowing for the packaging of any type of liquid food products.

[0003] These various containers have the disadvantage, for the user, of being either unhealthy when one wishes to drink straight from the container, or impractical depending on the shape and size of the neck, or the shape of the container itself.

[0004] In the particular case of metallic cans or cardboard packagings used for diverse and varied beverages, such as beers, sodas, fruit juices, or milk, they are very unhealthy. Indeed, from the locations where they are produced, after the beverage has been packaged, they are transported and unloaded without any specific hygienic measure, and then sold to the consumer by a retailer who stores them without any particular hygienic precaution and handles them manually. During these various manipulations, various microbes, viruses, bacteria or dust can be deposited on the walls of the containers, which are ingested by the consumer when he places his lips on the container.

[0005] Furthermore, in the particular case of metallic cans, and independently of hygiene problems, the consumer can be hindered when drinking the beverage by problems of ill-timed flow, which most often leaves stains on his clothes.

[0006] Therefore, a device for automatically extracting a straw has been developed to equip the cylindrical metallic cans of the type having a container closed by a crimped cover, which includes opening means constituted of a push ring adapted to displace a precut tongue inward of the can.

[0007] Such an extraction device is described, for example, in the published French

Patent No. 2 772 731, and includes a straw-supporting member constituted by an elastically deformable retention arm, one of the ends of which is connected to a peripheral ring, and the other of which includes means for retaining the straw. The peripheral ring is adapted to be sandwiched between the cover and more particularly its crimping groove and the upper peripheral rim of the container, whereas the retention arm is tensioned before being displaceably positioned and placed in support on a fixed abutment affixed to the peripheral ring. Such a method, which consists of deforming the arm before it is positioned beneath the cover requires a complex, expensive, and unreliable assembly line, particularly in view of the imposed high filling rates.

**[0008]** The present invention therefore proposes to resolve these disadvantages by proposing a device without fixed abutment for the deformed straw retention arm, and its embodiment method.

sub p2

**[0009]** Thus, according to the invention, the method of positioning, in a can including a container closed by a cover, a device for automatically extracting a straw, of the type including a straw-supporting member constituted by an elastically deformable retention arm adapted to be tensioned by elastic deformation, said arm including a retention tube for the straw, is characterized in that it consists of tensioning said arm by the direct or indirect effect of the cover during the coupling of said cover to said device.

**[0010]** According to complementary characteristics, the method includes the following preliminary steps:

a. fixing the straw to the retention arm to form an intermediate subassembly, namely, the straw-extraction device subassembly;

b. coupling of the intermediate subassembly to the cover to form a closure subassembly;

and the following complementary steps:

c. filling up the container with the desired beverage;

d. positioning the closure subassembly in the container;

e. crimping the cover on the container.

**[0011]** According to another characteristic, the method consists of tensioning the retention arm by the action of the cover on a projection affixed to the retention arm, or on the straw retained by the arm.

**[0012]** The invention also relates to the device for extracting a straw adapted to implement the method, which comprises a straw-supporting member constituted by an elastically deformable retention arm, one of the ends of which is connected to a peripheral ring or annular ring, whereas the free end of the arm includes means for retaining the straw.

**[0013]** According to a complementary characteristic, the means for retaining the straw are constituted by a retaining tube portion (10).

**[0014]** According to other characteristics, the device is obtained in a single piece made of injected plastic material, whereas the annular ring includes a succession of deformable lips that are peripherally sandwiched, during the crimping of the can, between the cover and more particularly its crimping groove and the upper peripheral rim of the opening of the container.

**[0015]** According to a preferred embodiment of the device, the retaining arm includes an actuation arm adapted to be actuated and displaced by the cover during the opening of the can, whereas the elastic connection of the retention arm to the peripheral ring is obtained by the succession of two elastically deformable zones: a first deformation zone enabling the am to move in horizontal pivoting about a vertical pivoting axis, and a second deformation zone, distinct from the first deformation zone, enabling the arm to move in vertical pivoting about a horizontal pivoting axis.

**[0016]** Other characteristics and advantages of the invention will become apparent from the description that follows, with reference to the annexed drawings, which are only provided by way of non-limiting examples.

Figures 1 and 2, respectively, show a perspective view of the opening of a container such as a metallic cylindrical can including the device of the invention.

Figure 1 shows the sealed can.

Figure 2 shows the open can, once the cap has enabled the straw to project out of the opening.

Figures 3, 4, 5, 6 and 7 show a first embodiment of the extraction device.

Figures 8, 9, 10, 11, and 12 show a second embodiment of the extraction device.

Figures 13, 14, 15, 16, 17 and 18 show the phases of the method, using the first embodiment of the extraction device.

Figures 19, 20, 21, 22, 23, and 24 show the phases of the method, using the second embodiment of the extraction device.

Figure 25 is a perspective bottom view of an alternative of the second embodiment of the device.

**[0017]** The invention relates to a method of positioning a straw automatic extraction device, generally designated by the reference numeral (1), adapted to automatically extract, when it is being opened, a straw (2) arranged within a container (3). The extraction device (1) is advantageously described in the particular case of the metallic cylindrical cans whose opening means are constituted in a known fashion by a push ring (4) and a precut tongue (5), also called the cap, which can pivot inward of the container (3) under the effect of the ring to free the orifice (6) of said opening means, as shown in Figures 1 and 2. It is understood that the automatic extraction device according to the invention could be modified to be adapted to other types of containers, or to other types of opening means without leaving the scope of protection of the invention.

**[0018]** The extraction device (1) adapted to be used with the method of the invention comprises a straw-supporting member (7) constituted by an elastically deformable

retention arm (8), one of the ends of which is connected to a peripheral ring or annular ring (9). Furthermore, the free end of the arm (8) includes means (10) for retaining the straw, which are constituted by a retaining tube portion (10) that is advantageously open to provide it with enough elasticity to ensure the pinching of the straw.

**[0019]** The extraction device is advantageously obtained in a single piece made of injected plastic material, whereas the annular ring (9) includes a succession of deformable lips (15) that are peripherally sandwiched during the crimping of the can between the cover (14), and more particularly its crimping groove and the upper peripheral rim of the opening of the container, as seen in Figures 6a and Figure 11a.

**[0020]** In a first embodiment of the extraction device (1) shown in Figures 3-7, the means (10) for retaining the straw are extended upward by a projection (11) for deforming the arm that extends upward.

**[0021]** Said projection (11) is constituted by a cylindrical wall portion whose upper end (12) is adapted to come into abutment on the lower wall (13) of the cover (14) during its coupling to said device, as shown in Figures 6 and 16, and, of course, during the crimping of the cover, thus causing the downward deformation along F of the arm (8), as shown in Figure 6 and Figure 16.

**[0022]** In a second embodiment of the extraction device (1), the retention arm (8), and more particularly its retaining means (10), does not include a deforming projection. According to this alternative embodiment, the deforming of the arm occurs by the direct effect of the cover on the straw. Furthermore, said arm (8) includes an actuating arm (18) adapted to be actuated and displaced by the cap (5) during the opening of the can. In this alternative embodiment, the elastic linkage of the retention arm (8) with the peripheral ring (9) is obtained by the succession of two elastically deformable zones: a first deformation zone (16) enabling the retention arm (8) to displace in horizontal pivoting about a vertical pivoting axis (XX'), and a second deformation zone (17), distinct from the first deformation zone (15), enabling the arm (8) to displace in vertical pivoting about a horizontal pivoting axis (YY'). It is noted that the second deformation zone (17) is a deformable flat section, but it could have any other shape, in particular that which is shown in Figure 25.

**[0023]** In the two embodiments of the extraction device (1), it is noted that in the non-stress rest position, as shown in Figures 3, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15, 19, 20, and 21, the retention arm (8) extends from the peripheral ring inward, substantially horizontally, at least in a plane substantially parallel to the general plane (H) of said ring (9).

**[0024]** Conversely, in the prestress active position, as shown in Figures 6, 11, 16, 17, 22, 23, and 24, the retaining arm (8) forms, together with the general plane (H) of the peripheral ring (9), a sharp angle (A) comprised between 20 and 60 degrees and, for example, 40 degrees.

**[0025]** According to the method of positioning the extraction device (1) according to the invention, the retention arm (8) is elastically biased downward along F, such that, during the opening, this elasticity is restored in order to have the straw (2) extracted out of the opening, as shown in Figures 2, 6, and 11.

**[0026]** The stressing of the arm is done at the time the cover (14) is coupled to the device (1), as shown in Figures 6, 11, 16, 17, 22, and 23 by the direct or indirect effect of said cover on the retention arm.

**[0027]** With the first embodiment of the device (1), the lower wall (13) of the cover (14) biases the retention arm (8) into a downward elastic prestress by its direct effect on the end (12) of the projection (11) for deforming the arm.

**[0028]** With the second embodiment of the device (1), the lower wall (13) of the cover (14) biases the retention arm (8) into a downward elastic prestress by its direct effect on the end (20) of the straw (2) retained by the tubular retaining portion (10).

**[0029]** It is understood that with the first embodiment of the extraction device (1), during the opening of the can, the cap (5) releases the retention arm (8) of the straw (2) which, having been elastically prestressed, returns to its inactive position to drive with it the end of the straw which then projects out of the opening (6).

**[0030]** With the second embodiment of the extraction device (1), the end (150) of the actuation arm (15) is arranged in the trajectory of the cap (5). Thus, during the opening

of the can, the cap (5) acts on the actuation arm (15) to pivot the assembly which it forms with the retention arm (8) about the axis (XX'), and thus to place the end of the straw in the zone of the opening (6), the straw projecting immediately through this opening by the release of the prestress.

**[0031]** The embodiment of the method includes the following preliminary steps:

a. Fixing the straw to the retention arm by introducing the straw into the retention tube (10) to form an intermediate subassembly (30), namely, the straw (2)-extraction device (1) subassembly,

During this operation, one should ensure that the straw extends upward by an adequate height (L) comprised between 10 and 25 millimeters (see Figures 13, 14, and Figures 19 and 20).

b. Coupling the intermediate subassembly (30) to the cover to form a closure subassembly (31).

In this step, the subassembly (30) is engaged beneath the cover (14) and clipped to the latter by cooperation of the succession of lips (15) with the peripheral groove (31) of the cover (see Figures 15, 16, and Figures 21 and 22). Of course, the positioning of the device with its straw with the cover is done with a relative predetermined angular orientation. During the clipping of the subassembly (30) to the cover, the lower wall (13) of the latter directly or indirectly forces the retention arm (8) downward so as to place it in the prestress position, as shown in Figures 6, 16, and Figures 11 and 22.

**[0032]** During the bottling itself, the following complementary successive steps are undertaken:

c. filling the container (3) with the desired beverage;

d. positioning the closure subassembly in the container, as shown in

Figures 17, 18, and Figures 23 and 24;

e. crimping the cover (34) on the container (3).

**[0033]** In the alternative embodiment shown in Figure 25, the second deformation zone (17) is a hollow open section, especially omega-shaped so as to provide said zone with appropriate elasticity.

**[0034]** The straw (2) used is advantageously a telescopic, flexed straw, i.e., which includes a deformation accordion.

**[0035]** It is noted that the device can include a guiding ramp (90) for the end of the straw, as seen in Figures 9, 10, and 25.

**[0036]** Of course, the invention is not limited to the embodiments described and shown by way of examples, but it also includes all of the technical equivalents, as well as their combinations.